

Docket No. F-6485

Ser. No. 09/509,808

**REMARKS**

The Amendment of claim 24 is supported, for example in the substitute specification page 5, line 17 to page 6, line 9 and page 6 lines 10-16. The Amendment should be entered since it is believed not to present any new issues, in view of the fact that the major components of wood are well-known, and laser light with a duration of up to 50 ms is disclosed as the major source of short time high energy input for increasing the temperature of the wood to achieve melting without the production of any significant amount of pyrolytic degradation products.

Reconsideration of this application, as amended, is respectfully requested.

Claims 24-31 have again been rejected under 35 U.S.C. 103 (a) as being unpatentable over Hashimoto, U.S. 5,484,685 (Hashimoto '685) or Hashimoto, U.S. 5,784,805. The disclosures of these two patents and the rejections are substantially identical, with such disclosures describing a method for treating wood with a mixture of a vaporized chlorinated hydrocarbon such as methylene chloride and water at an elevated temperature to melt the oil and fat contents of the cell membranes, including lignin, and creating perforations in such membranes thus draining the water confined to the cells and facilitating the drying of the wood.

It is submitted that this disclosure of Hashimoto does not render applicants' claimed wood component obvious to a person having ordinary skill in the art. Note that there is no specific disclosure or suggestion in the Hashimoto patents of a

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wood component having altered properties in geometrically defined, near surface areas substantially free from pyrolytic degradation products, as recited in applicants' claims. Moreover, this is not a question of unproven properties or characteristics of the wood component due to steps in the method of treatment. Rather, it is an apparent result of the specific treatment method as recited in amended claim 24 and its dependent claims utilizing laser light of up to 50 ms duration. Thus, as described in the substitute specification on page 6, line 16 to page 7, line 4, achieving geometrically defined near surface areas free from pyrolytic degradation products can be much more easily accomplished by manipulating the described laser light apparatus than by using the container apparatus and chlorinated solvent of Hashimoto. Consequently, it is unlikely that a person skilled in the art will be led to modify the Hashimoto system so as to arrive at applicants' claimed product.

Aside from what has been discussed hereinbefore, there are other significant distinctions between the product of Hashimoto and that covered by applicants' claims.

For example, in Hashimoto (U.S. '685, Col. 2, line19), the wood is enclosed in a container and the mixture of chlorinated hydrocarbon and water is brought to a temperature of between 100 °C and 130 °C. By these means, oils and fats in the cell membrane, including lignin, are "melted" and the cell membrane is

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perforated. The water, contained in the cell membrane, can emerge and evidently leads to a gentle drying of the wood.

The fact that, according to Hashimoto, lignin is also "melted" in the cell membrane is substantially different from applicants' claimed method. According to the present invention, not only is lignin in the cell membrane "melted", but, by means of a concerted input of energy in the form of electromagnetic laser radiation, the main components of the wood, such as cellulose, lignin and hemicelluloses are converted from the solid into a molten state (see substitute specification at page 5, line 16 to page 6, line 9).

The aforementioned main components of the wood are converted from the solid into the molten state by a contactless, brief (not more than 50 ms) and high input of energy. With that, the main components in the area of energy input (that is, in the geometrically defined regions) become molten, solidify rapidly and the otherwise typical pyrolytic decomposition processes are deliberately avoided.

In order to convert the main components of the wood at the surface into a glassy composition, the temperatures, locally reached, must be above the temperature range of 100 °C to 130 °C given by Hashimoto. As stated in the disclosure, the melting temperature of cellulose, calculated theoretically from the glass transition temperature by E.L. Back, (in an article cited on page 3, lines 7-9 of the substitute specification) is approximately 450 °C. Accordingly, a

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homogeneous surface of molten wood cannot be produced by a surrounding temperature of between 100 °C and 130 °C. Instead, lignin probably is partially "melted out of the" cell membrane, in order to produce a perforation.

Other known methods, for which lasers are used in conjunction with the processing of wood, relate to the cutting or severing of wood. Admittedly, the process commences there with the melting of wood components. However, contrary to the present invention, the melting is continued in an uncontrolled manner and is always associated with pyrolytic decomposition processes.

Finally, applicants were able to show experimentally that, due to the inventive selection of a brief and high input of energy by means of a laser (utilizing a laser beam, produced by a continuous carbon dioxide laser with an output of 2500 W and an effective spot diameter of 6 mm, with which the wood surface was scanned at a rate of 6 m per second), a homogeneous and closed surface of molten wood with a thickness of approximately 0.5 mm could be produced. This surface, so modified, does not have any brown discoloration due to pyrolytic decomposition products; it therefore is free of pyrolytic decomposition products. The formation of the molten surface can be seen without aids. It is distinguished by a silky gloss.

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A Notice of Appeal is being submitted herewith.


Applicant respectfully requests a three month extension of time for responding to the Office Action. The fee of \$980.00 for the extension is provided for in the charge authorization presented in the PTO Form 2038, Credit Card Payment form, provided herewith.

If there is any discrepancy between the fees due and the fee payment authorized in the Credit Card Payment Form PTO-2038 or the Form PTO-2038 is missing or fee payment via the Form PTO-2038 cannot be processed, the USPTO is hereby authorized to charge any fees or fee deficiency or credit any excess payment to Deposit Account No. 10-1250.

This application is now thought to be in condition for allowance and such action at an early date is earnestly solicited.

Respectfully submitted,

JORDAN AND HAMBURG LLP

By   
C. Bruce Hamburg  
Reg. No. 22,389  
Attorney for Applicants

Jordan and Hamburg LLP  
122 East 42nd Street  
New York, New York 10168  
(212) 986-2340